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Tuberculosis Hospital Discharge Study

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Tuberculosis (TB) has been a reportable disease in Missouri since the early part of this century. The Bureau of Tuberculosis Control maintains reports of verified TB disease and infection in a computerized registry. Prior to this study there was no measure of the completeness of reporting of TB in Missouri. The widespread use of the state TB labora–tory at Mt. Vernon and informal cross checking with reported STD and HIV/AIDS disease reporting led staff to estimate completeness at well over 90 percent. Recently, bureau staff, in conjunction with the Division of TB Elimination at the Centers for Disease Control and Prevention (CDC), utilized the statewide hospital discharge database to evaluate:

- The TB disease reporting rate of Missouri's hospitalized patients, and
- The predictive value of hospital discharge data for disease case finding.

Analysis of the hospital discharge billing records coded with TB-related diagnoses (ICD-9) between January 1995 and June 1996 yielded 866 medical records. One hundred and sixty eight of these were duplicate records. The remaining 698 records were cross-matched with the TB registry, resulting in 240 matches. An additional 300 matches were found using the TB infection registry, the state TB laboratory database and neighboring state registries. The matching process also involved reviewing and abstracting data from 258 medical records. Figure 1 illustrates the results.

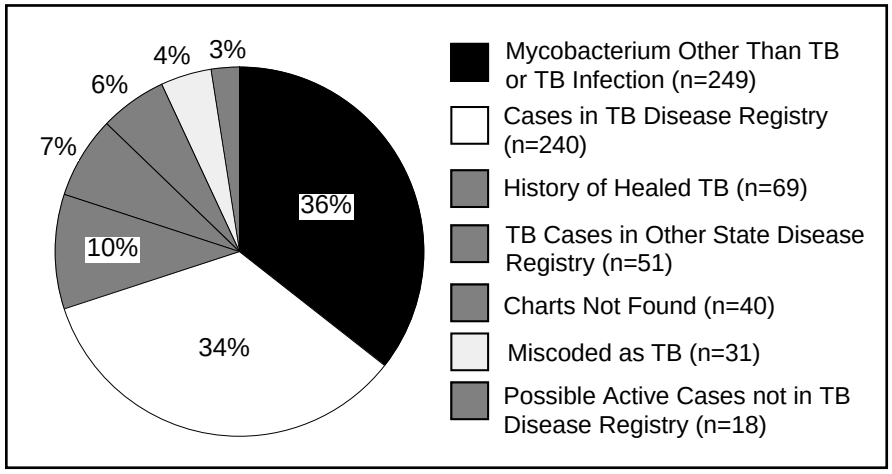

Figure 1. Results of tuberculosis hospital discharge study, Missouri, 1995–96.

There were 18 cases remaining that, based on available information, could not be ruled out as TB disease, and were not found in the TB registry. Only one case was confirmed by a positive culture; therefore, the presumptive diagnosis was based on the clinical evidence alone in most cases. See sidebar on page 2 for the criteria for reporting TB cases.

Based on these findings, and assuming all 18 cases were unreported, active TB disease cases, the sensitivity of the Missouri TB disease surveillance system is 93 percent (240/[240+18]) for patients discharged with a diagnosis of TB. The predictive value positive (PVP) of the discharge database, which measures whether or not a patient had confirmed TB disease when discharged with an

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ICD-9 code of TB, was also calculated. The PVP was 36 percent ([240+51+18/866]). Excluding duplicate records, the PVP increases to 44 percent ([240+51+18/698]).

The results of this study reflect well on the reporting record of Missouri's hospitals. Staff at the Department of Health appreciate the cooperation of all the hospitals in evaluating the registry, and encourage continued reporting of suspected TB cases in accordance with state mandates. Department and CDC staff will continue investigating the 18 remaining cases to determine if they were active TB disease cases and the reasons they may not have been reported or included in the registry. The department continues to cross check registry data with the HIV/AIDS registries, state laboratory data and pharmacy records to assure maximal reporting.

Discharge data had a low predictive value positive for finding cases of active TB (36%). An ICD-9 code of TB at discharge included many patients that did not have TB disease. Patients with a past history of TB, TB infection and suspected TB (that was ruled out later) also had the same discharge diagnosis. This non-specific coding primarily accounted for the low PVP. See Figure 1.

Most patients were discharged before the TB diagnosis was confirmed or ruled out, necessitating assistance from the state TB laboratory (which tests 85 percent of TB cases in Missouri). Because of the possibility of culture-negative clinical cases of TB, laboratory data alone were often not sufficient to rule out a case. There is no requirement to retain records on ruled-out suspect TB cases in local health agencies since the patient no longer has a reportable disease. This complicated the process of tracing a patient's clinical course, because the potential case may well have been reported and tracked before being ruled out, after which the records were discarded. For these reasons, the 93 percent reporting sensitivity calculated for Missouri's TB registry is probably an underestimate.

This was a very labor intensive investigation. It required 258 medical record reviews and cooperation from numerous hospitals and their infection control nurses, three Department of Health TB nurses, two CDC physicians and coordination with the rest of the TB Bureau staff over several months.

A complete and accurate surveillance system is key to controlling TB. We hope hospital staff maintain their excellent record for reporting all suspect TB cases to the Department of Health so Missouri may reach it's goal of TB elimination by the year 2010.

ACKNOWLEDGEMENTS: This project would not have been a success without the assistance from the bureau's southeastern and southwestern district nurses, Lynn Tennison, R.N. and Becky Hutchings, R.N. Special thanks for their thoroughness, timeliness and attention to detail in retrieving information on patients. The bureau also thanks the Center for Health Information Management and Epidemiology staff for providing the hospital discharge data that made this project possible and the staff at CDC, especially Dr. Eileen Schneider.

Criteria for Reporting TB Cases

All 50 states, the District of Columbia, New York City, United States dependencies and possessions, and independent nations in free association with the United States* report TB cases to the federal Centers for Disease Control and Prevention (CDC) based on certain criteria. All cases that meet the criteria, called **verified TB cases**, are counted each year.

Cases that meet **one** of these three sets of criteria are counted as verified TB cases:

1. The patient has a positive culture for *M. tuberculosis*

or

2. The patient has a positive smear for AFB, but a culture has not been done or cannot be done

or

3. The patient has a positive tuberculin skin test reaction, has other signs and symptoms of TB disease, is being treated with two or more TB drugs, and has been given a complete diagnostic evaluation.

In addition, cases that do not meet any of these sets of criteria (for example, a patient who is anergic and has a negative culture for *M. tuberculosis* but who has signs and symptoms of TB disease) may be counted as a verified TB case if a health care provider has reported the case and decided to treat the patient for TB disease.

* The dependencies, possessions, and independent nations include Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, the Republic of the Marshall Islands, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia.

Funding for Alternatives to Abortion

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Bureau of Family Health

In Missouri, there are about 14,000 abortions per year. Over the last several years, the state of Missouri has begun an investment in family planning, a primary prevention program that has reduced the number of unwanted pregnancies and increased the safe interval between pregnancies. During fiscal year 1995-96, the Department of Health received requests for twice the number of family planning payments than we had available resources. All of these additional requests came from Missouri health care providers giving care to uninsured women. When family planning services are not available to women because of cost, there will be some women who have an unplanned pregnancy. This can become a very significant crisis in the life of the affected woman and her family.

In the spring of 1996, the Missouri legislature added $900,000 of general revenue resources to the Department of Health budget for the purpose of providing alternatives to abortion services for pregnant women and those in the post-pregnancy period. This funding was limited to be used only by local health agencies and hospitals. To determine the best use of these funds, the Department of Health initiated a two-month evaluation process that included a complete literature review on abortion and alternatives to abortion and meetings with pro-life advocates, pro-choice advocates and a group of local health agencies and hospitals. The department also engaged in a planning process to link this funding to other existing department funding, including family planning services, pregnancy testing services, TEL-LINK information HELP line, abstinence education programs, breast and cervical cancer screening, and sexually transmitted disease programs. It also considered services not available to women on Medicaid. After these activities, the department elected to take the following three approaches for fiscal year 1996-97 to reach the shared goal of reducing abortions in Missouri.

The first approach involves an in-depth evaluation of adoption as an alternative to abortion. A contract with the Jackson County Health Department includes: an investigation regarding legal, social and educational barriers to adoption in our state; a literature review; a comprehensive, objective written description of the barriers and the steps necessary to successfully complete the adoption process in Missouri; the development of a pamphlet and poster promoting adoption; a plan for pamphlet and poster distribution; and a supply of 100,000 pamphlets and 200 posters. A public discussion including leaders from the executive and legislative branches should then be held regarding breaking down these barriers. The contract award is $73,000.

The second approach is to build on the recognition that many women seek repeated pregnancy tests as a way to reach for help. Some pregnancy tests are bought from stores; others are obtained in health clinics. In most health clinics, the resources are frequently not available to provide the kind of counseling for both positive and negative pregnancy tests that are required by many high-risk women. While pregnancy testing funding will be used from another source, $100,000 has been contracted to the Sinclair School of Nursing at the University of Missouri-Columbia to teach nondirectional, comprehensive pregnancy testing counseling throughout the state. Nurses and social workers will be trained to assist women with negative pregnancy tests in choosing appropriate family planning methods and developing life goals. Nondirectional counseling will be provided to women with positive pregnancy tests. A brochure describing women's options will be developed through this contract. The brochure could then be available both at the site of pregnancy testing and health clinics, as well as made available in a rack near store-bought pregnancy tests. In our literature review, it was clear that there are many reasons that women choose a particular outcome at the time of a positive pregnancy test. Professional, comprehensive information with follow-up services will assist in making the most appropriate decision.

The third approach is the most comprehensive. We believe that only through collaboration of the multiple resources available to women in communities can crises be resolved effectively. The repeat abortion rate is a statistic that both pro-life and pro-choice forces agree should be reduced. For the period 1992–94, the rate of repeat abortions in Kansas City and St. Louis ranged from 36.5 percent to 49.9 percent. In women who choose to have more than one abortion during their reproductive years, the most frequent causes for the unwanted pregnancy were not using contraception, failure to use contraception appropriately, or multiple social problems. Collaboration between local health agencies, hospitals, family planning and abortion facilities, and alternative services providers is essential to reducing the rate of repeat abortions. St. Louis City and Kansas City health departments have contracted for $350,000 each to create consortia of collaborating providers. The goal of these consortia will be to identify women at every step in the process from family planning to pregnancy testing, to abortion and post-abortion, as well as women choosing adoption and those keeping their children. At every step, women must know that support is there for them to choose the decision that most positively affects their lives. Women must know that if they choose to continue their pregnancies, support services are available. If they choose to terminate their pregnancies, they must know that this can be avoided in the future. The Department of Health believes that when

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Hepatitis A in Southwestern Missouri

Bureau of Communicable Disease Control

The southwestern area of Missouri has been experiencing a community-wide outbreak of hepatitis A (HAV) since the beginning of 1996. A total of 543 cases occurred during the first 11 months of 1996, which is an increase of 438 percent over the same period in 1995 when 101 cases of HAV occurred. The largest number of cases, 116, occurred in October. See Figure 1. The distribution of cases during this 11 month period was 42 percent female and 58 percent male, for a ratio of 1:1.38. Distribution of cases by county is shown in Table 1.

Usually the highest rates of HAV are among children ages 5–14 years. In southwestern Missouri during the first 11 months of 1996, 13 percent of the cases were in the 5–14 year age group. In contrast, 57 percent of the cases were in the 20–39 year age group. See Figure 2. The mean and median ages during this time period were both 28.

Close personal contact with a case of HAV is the greatest risk factor for the spread of this disease. Thirty three percent of the reported cases in southwestern Missouri during January to November 1996, reported close contact with another known case of HAV. Working in, or attending a child care center, appeared to be low risk for acquiring HAV, with only five percent of the cases associated with this type of exposure (national figures cite 15 percent).

Approximately 13 percent of the reported cases in southwestern Missouri during the first 11 months of 1996 have admitted to using street drugs. An informal survey of the local health agencies indicate they believe that drug usage is highly under-reported by the case patients. Close person-to-person contact during drug usage is thought to be the source of infection in outbreaks among injecting

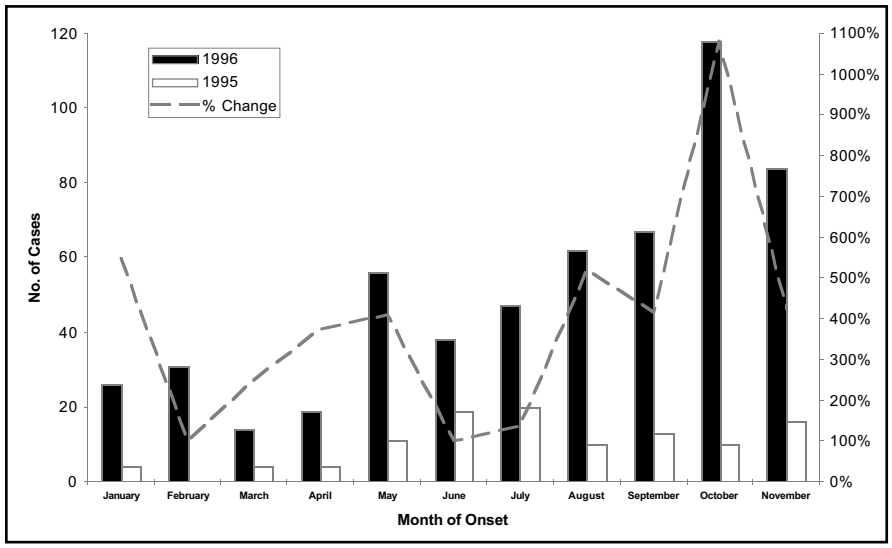

Figure 1. Number of hepatitis A cases by month of onset, Southwestern Health District, January–November 1996.

Table 1. Number of Hepatitis A Cases by County, Southwestern Health District, January–November 1995 and 1996

County	Jan–Nov 1995 Frequency	Jan–Nov 1995 % of Total	Jan–Nov 1996 Frequency	Jan–Nov 1996 % of Total
Barry	0	0.0%	21	3.9%
Barton	1	1.0%	3	0.6%
Bates	2	2.0%	1	0.2%
Benton	21	20.8%	11	2.0%
Cedar	4	4.0%	4	0.7%
Christian	3	3.0%	42	7.7%
Dade	1	1.0%	2	0.4%
Dallas	1	1.0%	16	2.9%
Greene	10	9.9%	124	22.8%
Henry	21	20.8%	7	1.3%
Hickory	1	1.0%	2	0.4%
Jasper	6	5.9%	91	16.8%
Lawrence	0	0.0%	25	4.6%
McDonald	3	3.0%	25	4.6%
Newton	2	2.0%	101	18.6%
Polk	2	2.0%	20	3.7%
St. Clair	2	2.0%	1	0.2%
Stone	1	1.0%	6	1.1%
Taney	0	0.0%	25	4.6%
Vernon	18	17.8%	6	1.1%
Webster	2	2.0%	10	1.8%
Total	**101**	**100.0%**	**543**	**100.0%**

and non-injecting drug users, although contaminated drugs may also play a role in disease transmission. Although the viremic period is short, exchanging needles and syringes could also spread the virus.

When hepatitis A is diagnosed in a food service worker, there is concern because of the possibility of exposure to a large number of patrons. Circumstances surrounding each case of hepatitis A in a food service worker are closely examined to determine the probability that HAV may have been transmitted to patrons. Guidelines issued by the Centers for Disease Control and Prevention (CDC) are used to determine associated risks and whether or not immune globulin (IG) is indicated for certain patrons who may have been exposed to HAV. These criteria are as follows:

- Types of foods the infected person handled, and how the foods were handled, and
- Hygienic practices of the infected person, and whether or not the person had diarrhea while working, and
- Whether or not patrons can be identified and treated with IG within two weeks of exposure.

During the first 11 months of 1996 in southwestern Missouri, 39 food service workers were diagnosed with hepatitis A (seven percent of the total number of cases). During this same time period, there were five public announcements alerting patrons of restaurants in southwestern Missouri to obtain IG (two in Taney County, one each in Benton, Greene and Newton counties). To date, health officials have been unable to link any of the other 504 cases of HAV in the district to an establishment where the infected workers were employed.

Several steps can be taken to curtail the spread of HAV, including:

1. Exclude HAV positive cases from high-risk occupations (food service,

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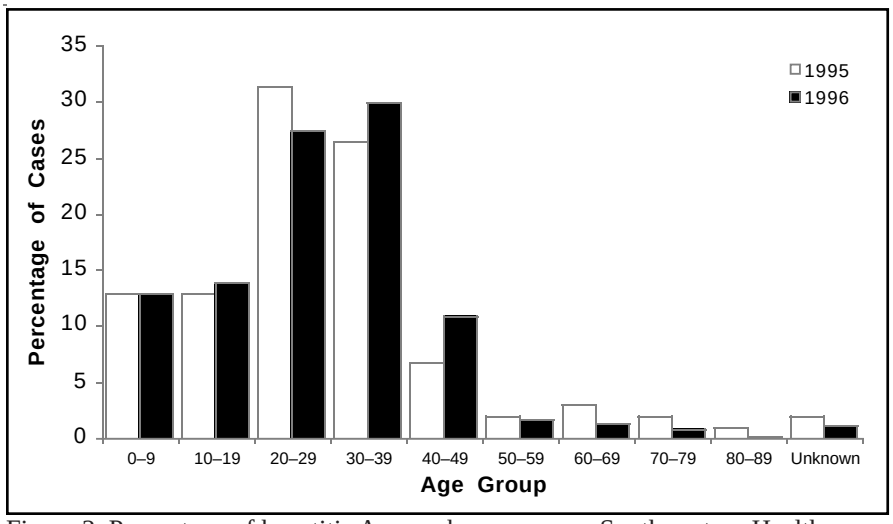

Figure 2. Percentage of hepatitis A cases by age group, Southwestern Health District, January–November 1995 and 1996.

Hepatitis A (HAV)

Cause: hepatitis A, one of the picornaviruses.

Symptoms: fever, malaise, anorexia, nausea, abdominal discomfort, jaundice.

Incubation period: 15 to 50 days; average 28 to 30 days.

Transmission: fecal-oral route through person-to-person contact; ingestion of contaminated food or water. Viremia occurs during the prodromal phase and HAV has been transmitted on rare occasions by transfusion.

Diagnosis: demonstration of IgM antibodies against hepatitis A virus (IgM anti-HAV) in serum of acutely or recently ill persons. IgM anti-HAV may remain detectable for 4–6 months after onset. The presence of total anti-HAV indicates the person has had HAV, but doesn't indicate if the infection is current or past.

Prevention:

- **Good sanitation and personal hygiene**
- **Proper immunization for travelers** to HAV endemic areas (IG or vaccine)
- **Proper cooking** of seafood from contaminated waters
- **Immune Globulin (IG)** is greater than 85% effective in preventing HAV when given within 2 weeks following exposure to HAV. Confers immunity for up to 3 months.
- **HAV vaccine** is inactivated and highly immunogenic; given in 2 or 3-dose series. (Two vaccines currently available; produced by SmithKline Beecham and Merck)

For more information regarding hepatitis A, immune globulin, or the vaccine, call the Bureau of Communicable Disease Control at (800) 392-0272.

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child care, caring for patients in hospitals and long term care facilities) until noninfectious.

2. Destroy potentially contaminated foods that will not be cooked further.

3. Maintain good handwashing and personal hygienic practices.

4. Use sanitary practices during food preparation.

5. Provide IG to high-risk contacts in a timely manner.

6. Promote the use of HAV vaccine.

In southwestern Missouri, the local health agencies and the Department of Health's Southwestern District Health Office are committed to curtailing this community-wide outbreak of HAV. Numerous educational programs have been presented to food service workers and other interested parties. Several local health agencies have incorporated HAV vaccination as a part of their services to persons employed in the food industry. Webster County Health Department initiated the practice, and others soon followed, including: Benton County Health Department, Branson City Health Department, Christian County Health Department, Dallas County Health Department, Hickory County Health Department, Joplin City Health Department, Polk County Health Department, St. Clair County Health Department and Springfield-Greene County Public Health Center. The local health agency purchases and administers the vaccine, and the food service establishment reimburses the health agency for the cost.

HAV vaccine will provide protection in children over 2 years of age and adults and is recommended for persons at increased risk of HAV infection, as well as for any person wishing to obtain immunity. The Advisory Committee on Immunization Practices (ACIP) identifies populations at increased risk for

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State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Sept 96	Oct 96	Total YTD
Specimens Tested	10,302	11,030	103,304
Initial (percent)	63.5%	63.4%	65,135
Repeat (percent)	36.5%	36.6%	38,169
Specimens: Unsatisfactory	151	186	1,581
HT Borderline	1,216	1,354	13,126
HT Presumptive	30	25	598
PKU Borderline	3	2	51
PKU Presumptive Positive	0	2	9
GAL Borderline	55	49	988
GAL Presumptive Positive	1	5	19
FAS (Sickle cell trait)	77	76	768
FAC (Hb C trait)	31	29	246
FAX (Hb variant)	14	11	135
FS (Sickle cell disease)	3	4	20
FSC (Sickle C disease)	0	0	8
FC (Hb C disease)	0	0	2

	Nov 96	Dec 96	Total YTD
Specimens Tested	8,681	10,262	122,247
Initial (percent)	63.3%	65.6%	77,356
Repeat (percent)	36.7%	34.4%	44,891
Specimens: Unsatisfactory	155	159	1,895
HT Borderline	895	1,292	15,313
HT Presumptive	25	44	667
PKU Borderline	0	1	52
PKU Presumptive Positive	1	0	10
GAL Borderline	47	48	1,083
GAL Presumptive Positive	2	3	24
FAS (Sickle cell trait)	70	90	928
FAC (Hb C trait)	20	21	287
FAX (Hb variant)	13	11	159
FS (Sickle cell disease)	1	2	23
FSC (Sickle C disease)	2	1	11
FC (Hb C disease)	0	0	2

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

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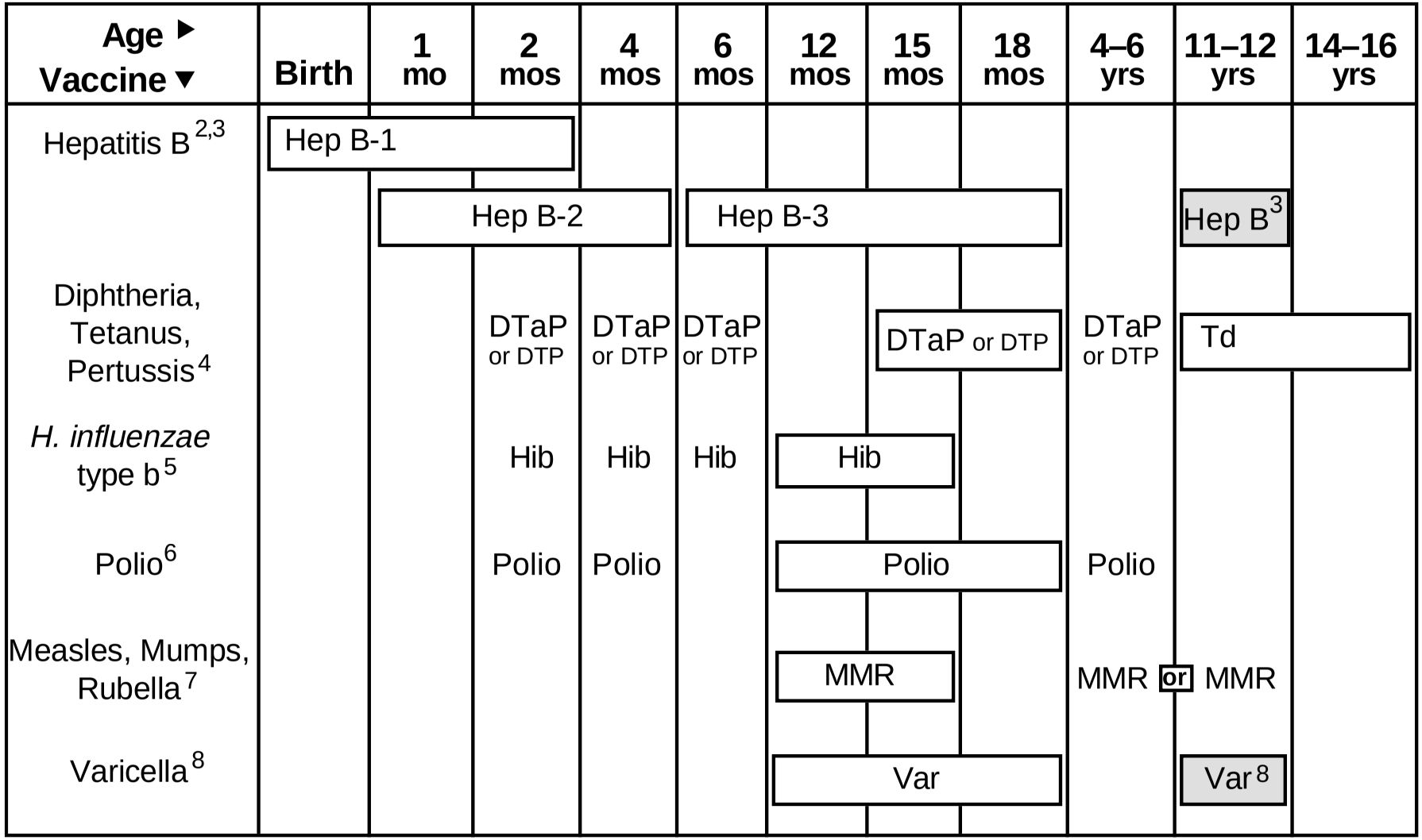
KEY

J/F96 = January/February 1996
M/A96 = March/April 1996
M/J96 = May/June 1996
J/A96 = July/August 1996
S/O96 = September/October 1996
N/D96 = November/December 1996

Recommended Childhood Immunization Schedule United States, January–December 1997

Vaccines[1] are listed under the routinely recommended ages. Bars indicate range of acceptable ages for vaccination. Shaded bars indicate catch-up vaccination: at 11–12 years of age, Hepatitis B vaccine should be administered to children not previously vaccinated, and Varicella Virus vaccine should be administered to unvaccinated children who lack a reliable history of chickenpox.



(see footnotes on back)

[1] This schedule indicates the recommended age for routine administration of currently licensed childhood vaccines. Some combination vaccines are available and may be used whenever administration of all components of the vaccine is indicated. Providers should consult the manufacturers' package inserts for detailed recommendations.

[2] **Infants born to HBsAg-negative mothers** should receive 2.5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SmithKline Beecham (SB) vaccine (Engerix- B®). The second dose should be administered >1 month after the first dose.
Infants born to HBsAg-positive mothers should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth and either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix- B®) at a separate site. The second dose is recommended at 1–2 months of age and the third dose at 6 months of age.
Infants born to mothers whose HBsAg status is unknown should receive either 5 µg of Merck vaccine (Recombivax HB®) or 10 µg of SB vaccine (Engerix- B®) within 12 hours of birth. The second dose of vaccine is recommended at 1 month of age and the third dose at 6 months of age. Blood should be drawn at the time of delivery to determine the mother's HBsAg status; if it is positive, the infant should receive HBIG as soon as possible (no later than 1 week of age). The dosage and timing of subsequent vaccine doses should be based on the mother's HBsAg status.

[3] Children and adolescents who have not been vaccinated against hepatitis B in infancy may begin the series during any childhood visit. Those who have not previously received three doses of hepatitis B vaccine should initiate or complete during the 11–12 year-old visit. The second dose should be administered at least 1 month after the first dose, and the third dose should be administered at least 4 months after the first dose and at least 2 months after the second dose.

[4] DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is the preferred vaccine for all doses in the vaccination series, including completion of the series in children who have received one or more doses of whole-cell DTP vaccine. Whole-cell DTP is an acceptable alternative to DTaP. The fourth dose of DTaP may be administered as early as 12 months of age provided 6 months have elapsed since the third dose and if the child is considered unlikely to return at 15–18 months of age. Td (tetanus and diphtheria toxoids, absorbed, for adult use) is recommended at 11–12 years of age if at least 5 years have elapsed since the last dose of DTP, DTaP, or DT. Subsequent *routine* Td boosters are recommended every 10 years.

[5] Three *H. influenzae* type b (Hib) conjugate vaccines are licensed for infant use. If PRP- OMP (PedvaxHIB® [Merck]) is administered at 2 and 4 months of age, a dose at age 6 months is not required. After completing the primary series, any Hib conjugate vaccine may be used as a booster.

[6] Two poliovirus vaccines are currently licensed in the United States: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). The following schedules are all acceptable by ACIP, AAP, and AAFP, and parents and providers may choose among them:

1. IPV at 2 and 4 months; OPV at 12–18 months and 4–6 years
2. IPV at 2, 4, 12–18 months, and 4–6 years
3. OPV at 2, 4, 6–18 months, and 4–6 years

The ACIP routinely recommends schedule 1. IPV is the only poliovirus vaccine recommended for immunocompromised persons and their household contacts.

[7] The second dose of MMR is routinely recommended at 4–6 years of age or at 11–12 years of age, but may be administered during any visit, provided at least 1 month has elapsed since receipt of the first dose, and that both doses are administered at or after 12 months of age.

[8] Susceptible children may receive Varicella vaccine (Var) during any visit after the first birthday, and unvaccinated persons who lack a reliable history of chickenpox should be vaccinated during the 11–12 year-old visit. Susceptible persons ≥13 years of age should receive two doses, at least 1 month apart.

Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP).

Immunization Schedule Updates for Polio and DTaP

Rhonda Kremer
Bureau of Immunization

IPV/OPV Sequential Schedule

Following a two-year review by the Advisory Committee on Immunization Practices (ACIP), the Centers for Disease Control and Prevention (CDC) has accepted their recommendation for polio immunization. The new recommendation calls for the introduction of a sequential schedule of inactivated poliovirus vaccine (IPV) followed by oral poliovirus vaccine (OPV) for routine childhood immunization. The goal of the sequential schedule is to reduce the eight to ten yearly cases of vaccine-associated paralytic polio (VAPP), a risk from OPV that has become more relevant in recent years with the eradication of wild polio from the Western Hemisphere. (Overall, about one case of VAPP occurs for every two and a half million doses of OPV distributed.) The initial dose of OPV in the sequential schedule is not administered until 12 months of age, which follows two doses of inactivated vaccine to build immunity; the risk of VAPP is greater after the first **live** dose. In addition, this schedule allows for a wider margin of safety for the diagnosis of unsuspected cases of immunodeficiency, thus protecting children from administration of live vaccine and increased risk of VAPP.

The recommended sequential series consists of two doses of IPV (at 2 and 4 months of age), and two doses of OPV (at 12–18 months and 4–6 years of age). This schedule is the preferred means to prevent paralytic poliomyelitis, either from wild poliovirus or associated with OPV use, by providing high levels of both individual and community protection. Schedules that include OPV alone or IPV alone meet current standards of care and remain acceptable options for childhood immunization.

While the American Academy of Pediatrics concurred with the new schedule, other groups, such as the American Academy of Family Physicians (AAFP), the National Black Nurses Association, the National Coalitions of Hispanic Health and Human Services and other organizations have voiced concerns regarding the new schedule.

Critics claim that inner-city and other disadvantaged children, who are already at risk for missed immunizations, might only receive the initial IPV doses and never receive the subsequent OPV doses, which confers intestinal immunity against the wild polio virus. They also state that the increased number of injections may lead to an overall reduction in immunization coverage.

Rather than favoring a sequential schedule, the AAFP supports giving equal weight to the three polio options (2 IPV/2 OPV, 4 OPV, or 4 IPV), thus allowing for maximal patient/provider choice.

Another concern is cost. At current federal contract prices, it will cost an additional $6.34 per child to implement the sequential schedule.

To address concerns about the new recommendations, the ACIP drew up a list of action steps to be taken in the following months which include monitoring the impact of the new regimen on overall immunization coverage and on the rates of other vaccine-preventable diseases, maximizing the use of vaccine registries, conducting surveillance for vaccine-associated paralytic poliomyelitis, and assessing patient and provider knowledge and attitudes about polio vaccination. CDC will be working with opposition groups to achieve a smooth implementation.

The revised ACIP recommendations were published in the Morbidity and Mortality Weekly Report Recommendations and Reports, January 24, 1997. The Bureau of Immunization implemented the new polio vaccine recommendations as of March 1, 1997.

DTaP Recommendations

After years of concern over the side effects of whole cell pertussis vaccines, the Food and Drug Administration (FDA) licensed DTaP (Diphtheria, Tetanus Toxoid, Acellular Pertussis) vaccine for use in infants at 2, 4, 6 and 15-20 months of age. The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends the use of acellular pertussis containing vaccine for the first four doses of the diphtheria, tetanus toxoid and pertussis vaccination series, as preferred to whole cell vaccine for routine immunization, including infants who have already received one or more doses of the whole cell vaccine.

Currently there are three DTaP vaccines licensed for the first four doses: Tripedia (Connaught), ACEL-IMUNE (Wyeth-Lederle) and Infanrix (SmithKline Beecham). Tripedia and Infanrix have not yet been licensed for the fifth dose among children 4 to 6 years of age who received either vaccine for the prior four doses because data are insufficient to establish the frequency of adverse events following a fifth dose. ACEL-IMUNE, however, has been licensed for all five doses in the series. All available acellular vaccines may still be used for the fourth and fifth doses for children who received three prior doses of whole-cell DTP.

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IMMUNIZE: Five Visits by Two, It's Up To You!

(continued from page 11)
Efficacy of the DTaP vaccine has been demonstrated in several large clinical trials in Europe and the United States during the last ten years. It appears that the new vaccine may confer longer protection against disease. In addition, the acellular vaccines are undergoing safety and efficacy testing for use in adults, who represent an important reservoir for pertussis disease and a source of infection for children. The ability to administer booster doses of vaccine later in life may counteract the waning of both vaccine-induced and natural immunity, which leaves adults susceptible to infection and subsequent transmission. Whole cell pertussis vaccines are currently not recommended for anyone over 7 years of age, due to concern over the potential severity of reactions in older children and adults. Acellular vaccines contain only specific proteins and have been demonstrated to be less reactogenic in children, which may hold true for adults as well.

Acellular pertussis vaccines are associated with a large reduction in the most frequent side effects, such as localized tenderness and fever greater than 101˚F. More serious side effects, such as drowsiness and irritability, exhibited significant reductions as well. The frequency of the most severe reactions, such as anaphylaxis and encephalopathy, did not appear to be different than those for the whole cell vaccine. However, these reactions are extremely rare and therefore were hard to assess for statistical significance in the recent clinical trials.

One disadvantage to the DTaP vaccine is the fact that it is not combined with Hib (*Haemophilus influenza* type b) vaccine as is the whole cell DTP, requiring the two be given in separate injections. However, it is anticipated that a new DTaP/Hib combination vaccine may be available for the primary series in the near future. The other disadvantage is the cost of administering separate DTaP and Hib vaccines, which, at current federal contract prices, cost more per dose than the DTP/Hib combination vaccine. However, with three available DTaP vaccines on the market, competition should result in price reduction.

The Bureau of Immunization implemented the new DTaP recommendations in January 1997. During the transition from the routine use of whole-cell pertussis vaccine (DTP) to acellular pertussis vaccine (DTaP), whole cell vaccines and vaccine combinations are acceptable for all doses in the pertussis vaccination series.

The current childhood immunization schedule can be found on pages 9 and 10 of this issue. **If you have any questions regarding the new DTaP or polio vaccine recommendations, please feel free to call the Bureau of Immunization at (573) 751-6133.**

Upcoming Symposium

Immunizations Today and Tomorrow

Bee Wise.
Immunize.

Friday, June 6, 1997
Community Center for Health and Education
Saint Joseph Health Center
1000 Carondelet Drive
Kansas City, Missouri

Physicians, nurse practitioners, nurses and other health care professionals from Kansas and Missouri are invited to participate in this symposium. This one-day event will highlight new developments in immunizations.

Sponsored by:

Kansas Department of Health and Environment
Missouri Department of Health
Merck Vaccine Division
Pasteur Merieux Connaught

The symposium will feature presentations from Dr. Bill Atkinson from the Centers for Disease Control and Prevention's National Immunization Program; Katie Steele, Regional Director of Health and Human Services, Region VII; Dr. Sandor Feldman, Chief of Pediatric Infectious Disease at University of Mississippi Medical Center; and Dr. Jay Lieberman, a pediatric infectious disease expert from Los Angeles. Breakout sessions will focus on tracking and registry issues, standards of immunization practice and state immunization issues and programs.

Continuing education credit will be available for nurses and physicians for this program.

The symposium is open by reservation to any person interested in immunization issues. Brochures with registration forms will be mailed in March. For more information or to be placed on the mailing list, please call the offices of the Mid-American Immunization Coalition at (816) 235-5479.

Well-Child Outreach Project

Terry Weston, B.A.
Bureau of Family Health

The Missouri Department of Health recognizes that preventive health screening for a child is the best way to detect problems at an early stage when they can most easily be treated. While parents may take their children to the doctor or clinic frequently, the visits are often due to illness or injury, when it is a matter of necessity. It is more difficult for parents with many obligations and time constraints to find additional time to schedule a well-child checkup.

A well-child checkup can include a physical examination; immunizations; vision, dental, lead and hearing screening; and a developmental screening. It offers parents the opportunity to ask questions about what to feed their children, what to expect in terms of their growth and development, and how to handle various behavior problems. Health care providers can furnish guidance on these parenting issues, as well as information on child safety. If problems are detected, the provider can schedule further evaluation, or refer the child or the family to other services as needed.

An effort is being made by the Department of Health to heighten the awareness of parents about the importance of preventive health screening. The department is also collaborating with the Department of Social Services' Division of Medical Services to increase the participation rate in Healthy Children and Youth exams (formerly known as EPSDT exams) for Medicaid-eligible children.

Bureau of Family Health staff distribute health education materials relating to preventive health screenings to families at health fairs and expos, and also to professionals who have direct contact with families. The bureau works with community-level organizations such as Parents as Teachers, HeadStart, licensed child care facilities, Division of Family Services offices and county health departments, as well as with doctors and clinics, to get this information into the hands of Missouri families. Media outlets such as radio and television programs and newspaper articles are also being utilized to help "get the word out" about preventive health screenings for Missouri's children. In addition, the bureau is working with family and consumer science classes in middle schools and in junior and senior high schools. Teachers of these classes will develop a curriculum on child health, culminating in a poster contest with the posters depicting a well-child exam.

If you have questions or suggestions for this program, please call Terry Weston at (800) TEL-LINK (800-835-5465).

TEL-LINK

TEL-LINK is the Missouri Department of Health's toll-free telephone line for maternal, child and family health services. The purpose of TEL-LINK is to provide information and referrals to Missouri residents concerning a wide range of health services. Callers are given referrals and then are transferred immediately to the appropriate agency.

The directory for the toll-free number includes:

- local health departments
- social service agencies
- prenatal clinics
- crisis pregnancy centers
- family planning clinics
- child care resource and referral agencies
- obstetric and pediatric hospitals
- area offices for children with special health care needs
- community health centers
- domestic violence shelters
- alcohol and drug abuse treatment centers
- sexual assault centers
- mental health centers
- crisis intervention centers
- other health care centers

Missouri residents may call 1-800-TEL-LINK at (800) 835-5465, Monday through Friday, between 8 a.m. and 5 p.m. to find out where services are located in their area and to order brochures and posters. Recorded messages are taken 24 hours a day, seven days a week.

Mosquito-Borne Disease Surveillance Program – 1996

Michael Hastriter, B.S., M.S.
F. T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

The Department of Health conducted surveillance programs for St. Louis (SLE), Western Equine (WEE), Eastern Equine (EEE), California (CE) and LaCrosse (LAC) encephalitis during the 1996 mosquito season. Active surveillance systems were operational for human cases of disease, equine cases of disease, virus activity in mosquitoes and virus activity in wild birds.

Human, horse and wild bird sera were tested using an enzyme linked immunosorbent assay (ELISA) technique designed for detection of IgM antibodies specific for the viruses mentioned above. Suspect positives were submitted to the Centers for Disease Control and Prevention (CDC) for confirmation.

Active Surveillance for Human Cases of Disease

Human arboviral surveillance activities consisted of standard weekly reporting by physicians in addition to statewide telephone contact with pre-designated hospitals on a weekly basis through the sentinel active surveillance system. Seven human sera were analyzed. SLE, WEE and LAC were not detected, indicating that there were no human arboviral cases detected in Missouri. Illinois had one case of SLE.

Active Surveillance for Equine Cases of Disease

Thirteen veterinarians throughout the state were contacted by telephone on a weekly basis. Fourteen equine sera were analyzed and found negative for SLE, WEE and EEE. All reports indicated no arboviral activity in horses in Missouri during this period. Large numbers of horses are vaccinated against these diseases.

Active Surveillance for Arboviral Activity in Wild Birds

Trapping of wild birds began on May 1, 1996 via a contract with the Wild Animal Damage Control Unit of the United States Department of Agriculture. A total of 1,001 wild birds of five species were collected from eight counties (Boone, Buchanan, Cape Girardeau, Cass, Jackson, Marion and St. Louis) through October 1, 1996. The majority of birds were English Sparrows; other bird species included Common Grackles, Cardinals, Barn Swallows and European Starlings. Sera from all birds were negative.

Arboviral Surveillance in Vector Mosquito Population

The earliest adult mosquito collections began on May 16, 1996 and all areas were fully operational by the second week of June. Trapping was accomplished with CO_2 baited CDC and EVS Light Traps, Reiter Gravid Traps and hand collection at selected resting stations by aspirator. Collections were done in four areas: Cape Girardeau County, Clay County, St. Louis County and St. Louis City. Vector mosquito populations as evaluated from this limited sampling, plus general observations, were considered to be low. Although it is impossible to accurately gauge rainfall for the entire state, the National Weather Service considered rainfall for Missouri to be slightly above average in 1996.

The Virology Laboratory at Southeast Missouri State University provided analysis for EEE, WEE, SLE and LAC virus in vector mosquitoes. There were 1,945 pools of adult vector mosquitoes tested for WEE, SLE and LAC by antigen capture ELISA. Pools included 48,725 specimens of *Culex pipiens, Culex restuans, Culex salinarius, Culex tarsalis, Coquillettidia perturbans, Aedes triseriatus* and *Aedes albopictus.* All tests were negative, indicating that arboviral activity was not occurring or could not be detected in mosquitoes in these areas.

Nuisance adult mosquito populations were high during the early mosquito months. Once natural predators caught up and consumed the food supply, the number of nuisance mosquitoes did not appear to be a problem. The composition of the nuisance mosquitoes caught in the light traps were primarily *Aedes vexans, Culex erraticus, Psorophora sp.* and *Anopheles sp.*

Discussion

The floods of 1993 and 1995 have potentially increased the risk of mosquito-borne diseases for the next four to six years. With federal funding from the emergency flood grant, Missouri was able to implement three active prevention surveillance systems: wild bird surveillance, sentinel chicken flock surveillance and mosquito surveillance. These programs were conducted in addition to an expanded active human and equine surveillance system. From 1993 through 1995, a window of opportunity was presented to permit action to be taken to prevent outbreaks of disease in human populations. Grant funds were terminated on October 20, 1995, but other resources were utilized to operate active surveillance systems for human and equine cases of disease, wild bird surveillance and a limited mosquito surveillance system in 1996.

Mosquito-borne disease outbreaks normally occur three to four years after a major flood, after there is amplification of the virus in the environment. Based on the fact that Iowa found SLE in a

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Tuberculosis Diagnostic Services

Bureau of Tuberculosis Control

The Tuberculosis Diagnostic Services Program was started in July 1993 as part of the effort to control and eliminate tuberculosis. The program provides tuberculosis evaluation services for economically disadvantaged patients, particularly those in rural areas of the state, who are identified as infected with, or suspected of having, tuberculosis.

The eligibility of a client to participate in the Diagnostic Services Program is determined by the local health agency, based on the following criteria:

1. Skin test positive or having signs or symptoms of tuberculosis disease;
2. Not covered by health insurance; **and**
3. Without the financial capability of accessing proper health care services for tuberculosis.

Once eligibility is established, the patient is allowed to choose a physician from a list of Diagnostic Services Program providers. The local health agency assures that an appointment is made for the patient and that appropriate follow-up occurs. If the patient is placed on medications, the local health agency will see that the patient receives the proper regimen. The entire regimen of medications is sent to the local health agency by a participating pharmacy on contract with the Missouri Department of Health, Bureau of Tuberculosis Control. There is no cost to the patient for tuberculosis medications.

The local health agency monitors the patient's compliance, and checks the patient for any signs or symptoms of drug toxicity and for signs of an improving or worsening condition. Directly observed therapy (DOT) for tuberculosis disease patients is also provided by most county health departments. As the name implies, DOT involves an individual directly observing a tuberculosis patient as they take the tuberculosis medication to be sure they are ingesting the proper dose at the proper time for the proper number of months.

All clinical specimens for diagnostic testing are sent to the Missouri State Tuberculosis Laboratory at the Missouri Rehabilitation Center in Mount Vernon. As a consequence, there are no costs associated with testing incurred by either the participating physician or the patient.

The Diagnostic Services Program will pay for eight office visits, one chest x-ray and induced sputum collection for tuberculosis follow-up at specific, pre-set rates.

New doctors and clinics are added monthly to the growing list of providers. Currently there are 57 providers in 39 counties of the state. Since the inception of the program, 755 individuals have received diagnostic and treatment services.

Interested clinics or physicians may contact the Bureau of Tuberculosis Control at (573) 751-6122 or 1 (800) 611-2912 for information on how to enroll in this program.

Mosquito-Borne Disease Surveillance

(continued from page 14)
sentinel chicken flock and Illinois had two human cases of SLE in 1995, along with SLE activity in wild birds in Missouri, it was anticipated that 1996 had the potential for an abundance of SLE activity if climatic conditions produced an abundance of vector mosquitoes. The surveillance systems operated during 1996 did not produce evidence of viral activity or disease.

The goal of surveillance is to detect cases of disease and then take specific action to prevent additional cases of disease. In this instance, neither cases of disease nor viral activity were detected, thus action to prevent additional cases was not necessary. Presuming that the surveillance implemented was adequate, the surveillance program also met its objectives and was successful. The fact that health officials knew that secondary preventive measures did not need to be taken also constitutes success.

Without an adequate surveillance system, the human population could be affected before health officials know of the problem and before they could muster an assessment of the situation, develop policy and take preventive action.

Abortion Alternatives

(continued from page 3)
providers begin truly collaborating for the purpose of enhancing the lives of the women they serve, abortions will decrease and families will be strengthened.

Contracts were provided for all of the above programs in the middle of October. It was a Department of Health decision that understanding the problem better and spending the time necessary to develop what will hopefully be effective long-term interventions was well worth the effort. The department estimates that significant outcomes from these interventions will take several years. This program must be delivered in the context of fully accessible family planning services.

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The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

LATE BREAKERS

Look for this new feature in future issues of the *Missouri Epidemiologist*. We will use this format to announce items of current interest in public health.

- ☞ According to the most recent National Immunization Survey (NIS), 76% of Missouri's two-year-olds are appropriately immunized. The NIS is an ongoing survey that provides estimates of vaccination coverage among children aged 19–35 months of age for each of the 50 states and 28 selected urban areas. Children born during February 1992 through May 1994 were included in this reporting period. The results reflect immunization levels for the four DTP, three polio and one MMR series. The national average for this series is also 76%. For more information, contact the Bureau of Immunization at (573) 751-6133.
- ☞ Since the resignation of Dr. Coleen Kivlahan effective November 30, 1996, Ronald W. Cates is serving as the Interim Director for the Department of Health and Bert Malone is serving as Interim Deputy Director. They can be reached by phone at (573) 751-6001, or you can reach Mr. Cates by e-mail at CatesR@mail.health.state.mo.us.
- ☞ Tuberculosis in Missouri continues to decline from 244 cases reported in 1995 to 224 cases reported in 1996. For more info, call TB Control at (573) 751-6122.
- ☞ Spring flooding is likely in Missouri. To date in 1997, three deaths in Missouri have been attributed to flash flooding/low water crossings. Do not attempt to cross flooded roadways and bridges. Two feet of water will carry away most vehicles. Driving through as little as eight inches of water can stall a small vehicle.

Hepatitis A

(continued from page 6)
infection or the adverse consequences of infection, as:

- Persons traveling to or working in countries with high or intermediate endemicity of infection.
- Children in communities with high rates of HAV infection and periodic HAV outbreaks.
- Men who have sex with men.
- Illegal drug users.
- Persons with occupational risk of infection (such as working with HAV-infected primates or with HAV in a research laboratory).
- Persons with chronic liver disease.
- Persons with clotting factor disorders.
- Other groups such as foodhandlers.